The Incidence of Active TB Among Healthcare Workers with LTBI in Tertiary Hospital Settings

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On behalf of the PCCP TB Council LTBI Study Investigators

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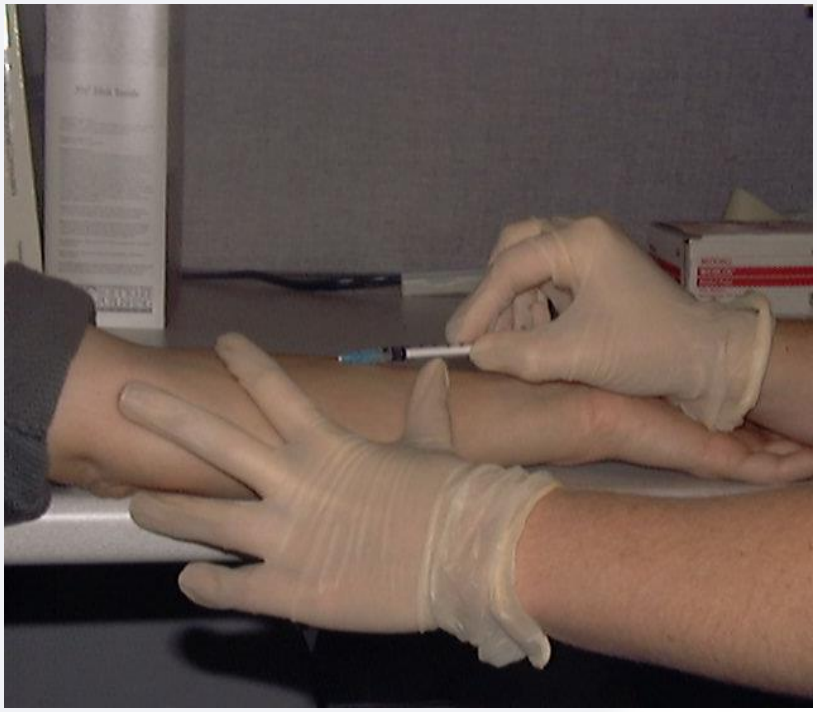
BACKGROUND and SIGNIFICANCE

- Local data on the burden of TB among HCWs in tertiary hospital settings (?)
- Implications on monitoring? Value of prophylaxis?
- Context of a low HIV and high TB setting



THE STUDY

- **PROJECT TITLE:** THE INCIDENCE OF ACTIVE TUBERCULOSIS AMONG HEALTH WORKERS WITH LATENT TUBERCULOSIS INFECTION IN TERTIARY HOSPITAL SETTINGS

- Prospective, cohort over 2 years in 10 tertiary hospitals

- *Study setting :* tertiary hospital settings (UP-PGH Medical Center, Manila Doctors Hospital, Chinese General Hospital,St. Luke's Medical Center, Lung Center of the Philippines, Philippine Heart Center, Veterans Memorial Medical Center, Perpetual Help Medical Center, PTSI-Quezon Institute, Dela Salle University Medical Center)

OBJECTIVES

General Objective:

- To determine the prevalence of latent tuberculosis infection and incidence of active TB disease among health care workers with LTBI in tertiary care hospital settings.

Specific Objectives :

1. To determine the prevalence of latent TB infection among healthcare workers(doctors, nurses, nursing assistants, and institutional workers) assigned in the medicine wards in tertiary hospital settings.

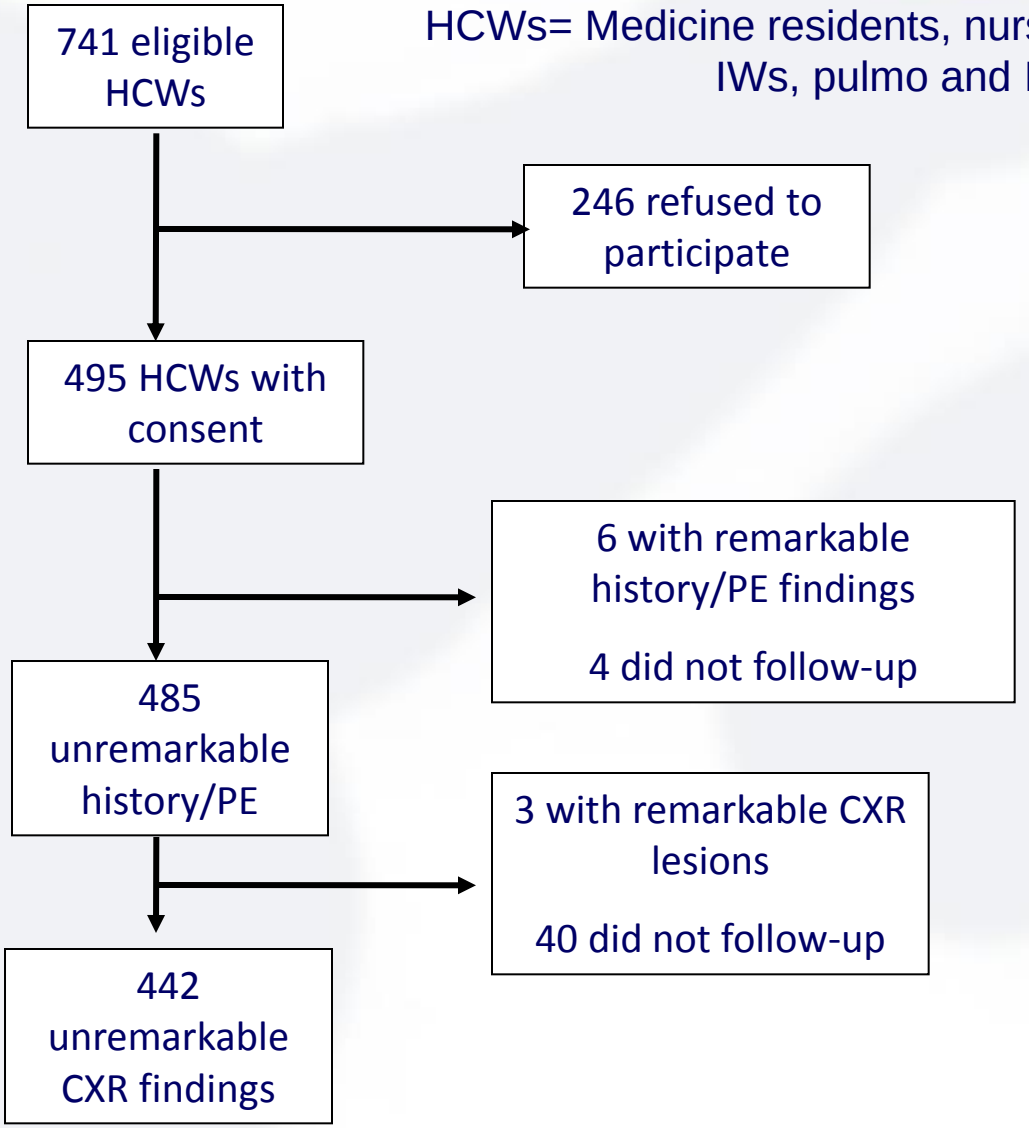
2. To determine the incidence of active TB disease among healthcare workers with latent TB infection.

3. To identify the association of the following suspected risk factors with active TB disease among healthcare workers with LTBI.

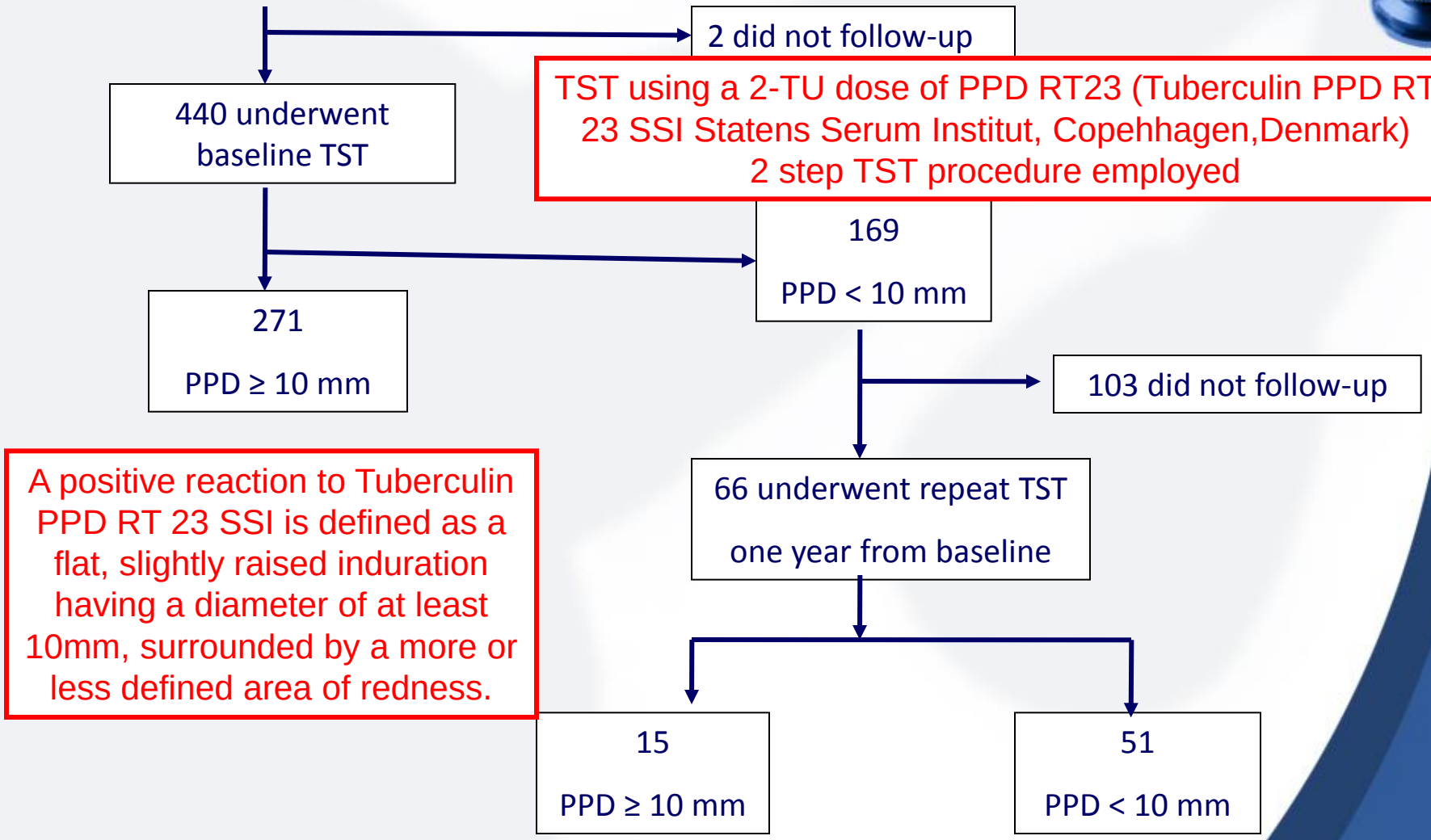
4. To determine the incidence of PPD conversion among PPD negative healthcare workers.

STUDY FLOW and METHODOLOGY

HCWs= Medicine residents, nurses, NAs, IWs, pulmo and ID fellows



STUDY FLOW and METHODOLOGY



RESULTS and DISCUSSION

Participant Characteristics (n=337)

Characteristics	No. of Participants (%)
Age (years)	
20-30	195 (57.86%)
31-40	107 (31.75%)
41-50	20 (5.93%)
51-60	13 (3.86%)
> 60	2 (0 .60%)
Sex	
Male	107 (31.75%)
Female	230 (68.25%)
Job Category	
Nurse	103 (30.56%)
Nursing Attendants (NA)	69 (20.47%)
Institutional Workers (IW)	19 (5.64%)
Medical Resident	105 (31.16%)
Fellows/Medical Staff	41 (12.17%)

RESULTS and DISCUSSION

Characteristics	No. of Participants (%)
Years Served in Current Occupation	
≤ 1 year	137 (40.65%)
2 - 5	115 (34.12%)
6 -10	38 (11.28%)
> 10	47 (13.95%)
BCG vaccine scar present	212 (63%)
Had direct contact with a TB patient in the workplace	281 (83.4%)
Lived in a household with an individual with TB	21 (6.23%)

RESULTS and DISCUSSION

LTBI and Active TB

- The prevalence of LTBI in this cohort was computed to be **84.87% (95% CI, 80.59%-88.52%).**
- The incidence of PPD conversion was **22.73% (95% CI, 13.31%-34.70%) after one year.**

- **For tenure, the OR was equivalent to 1.12 (95% CI, 1.02-1.24) and for age, the computed OR was 1.03 (95% CI, 0.99-1.08).**

Occupation	With LTBI (n = 286)	Without LTBI (n = 51)	Odds Ratio (95% CI)
Medical resident	59	23	-- [a]
Fellow/Medical staff	31	9	1.34 (0.55-3.25)
Institutional Worker	14	0	No OR
Nursing Attendants	57	3	**7.41 (2.11-26.03)**
Nurse	125	16	**3.04 (1.50-6.19)**

LTBI PREVALENCE AND RISK FACTORS AMONG HCWs

SITE	LTBI PREVALENCE (TST)	RISK FACTORS
Hanoi, Vietnam (Lien et al; 2009)	66.3% (2TU)	age; low educational level; high BMI
Henan, China (He et al; 2010)	55.6% (5TU)	older age; longer duration of employment; worked with active TB pxs (areas)
Malaysia (Rafiza et al; 2011)	10.6% (2TU)	35 years old; worked as nurse; being male; living with household contacts
Country of Georgia (Mirtskhulava et al; 2008)	67% (5 TU)	more than 5 years employment; age >30 years old
India (Pai et al; 2005)	50% (1 TU)	increasing age and duration of employment

RESULTS and DISCUSSION

- 4 developed TB (2 NAs, 1 nurse, 1 medical resident). (characteristics)
- Incidence of active TB disease among HCWs with LTBI was **1.4% (95% CI, 0.4%-3.5%)**.

- Odds ratios were computed. Factors like past history of any lung disease, alcoholic beverage drinking, smoking, nature of work, duration of employment, result of TST at baseline, and the size of the induration as a reaction to TST have no significant risk as to developing active TB.

- **In the current study, the incidence of LTBI was calculated to be 54.95 per 100 person-years.**
- **Our study estimates that the incidence of active TB among HCWs with LTBI is 9.04 per 1,000 person-years.**

ACTIVE TB INCIDENCE AMONG HCWs

- Medical staff in Henan, China: TB prevalence: 6.7/1000
- Baussano et al (2011): TB incident ratio: 3.7 (high TB burden countries)
- Joshi (2006): low-to-middle income countries: attributable risk for TB disease: 25 to 5361/100,000
- India (2006): medical residents: 11.2/1000 person years

DISCUSSION

- Low incidence of active TB in our study. Not designed to distinguish between infection and disease that might have been obtained from the community or hospital

- Potential explanations: short observation period, young HCW population, infection control practices

CONCLUSION

- Our study documented the high prevalence rate of LTBI among HCWs assigned in the medical service areas of ten tertiary hospitals in the Philippines.
- Nurses and nursing attendants were relatively at higher risk of acquiring the infection compared to medical residents in this setting.
- There was a relatively low incidence rate of active TB disease among these infected HCWs over the two year study period.
- There was no significant risk factor that was identified to be associated with the development of active TB during the study duration.

POTENTIAL IMPLICATIONS

- Screening of HCWs (?role of TST). Annual check up (structured questionnaire and CXR-PA)
- Secondary chemoprophylaxis (?cost-effectiveness)
- Infection control practices and HCWs' health-seeking behaviour. Education and addressing potential employment concerns. Pro-actively screen those at high risk

RECOMMENDATIONS

- Comparison with IGRA
- Possibly extending the observation period (? 5 years) to include senior and junior staff
- Similar study among frontline DOTS workers
- Study on chemoprophylaxis

CENTER	SITE INVESTIGATORS
Chinese General Hospital	Shirley Panganiban, MD Cheila Coliat, MD
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Manila Doctor Hospital	Lalaine Mortera, MD Gian Carlo Arandia, MD
Philippine Heart Center	Rodolfo Tamse, MD Christopher Cortes, MD
Quezon Institute	Roy Licaycay, MD
St. Lukes Medical Center	Marietto Partosa, MD Lolita Micu, MD
University of Perpetual Help Dalta Medical Center	Melvin Dalluay, MD Noel Estrella, MD
University of the Philippines- Philippine General Hospital	Lemuel Lee, MD Andrei Tanque, MD
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